Bioterrorist Agents: Brucellosis
Learning Objectives

Become familiar with the following aspects of Brucellosis:

- Epidemiology
- Transmission
- Clinical features
- Diagnosis
- Treatment
- Prevention
Background

- *Brucella melitensis* discovered by Bruce in 1887
- Types: *B. melitensis, abortus, suis, neotomae, ovis, canis*, and types infecting marine mammals
- Pathogenic types in humans - *B. melitensis, abortus, canis* and *suis*
- Zoonotic disease
Brucellosis- definition

A multisystem disease with a broad range of symptoms including acute or insidious onset of fever, night sweats, undue fatigue, anorexia, weight loss, headache and arthralgia.
Epidemiology

- Incidence in US: <0.5 cases per 100,000 primarily *B. melitensis*
- Most cases in the US are reported from California, Florida, Texas and Virginia
- High risk areas: Mediterranean Basin, South and Central America, Eastern Europe, Asia, Africa, the Caribbean and the Middle East.
Transmission

Three methods of transmission:

1. Ingestion – unpasteurized milk or dairy products. Ingestion is most common method of transmission.

2. Inhalation – breathing in the organism. Lab workers are high risk.

3. Wound contamination – high risk occupations include hunters, slaughterhouse workers, meat packing plant workers and veterinarians.
Potential For Intentional Harm?

- CDC Category B agent
- Most likely route of intentional exposure: Respiratory
  - Could also happen via contamination of food/drink
- Identify intentional exposures as any BT agent:
  - Common Source
  - Unlikely patients
  - Unlikely Season
  - Multiple Patients
  - Geographic correlation
Case Definition

- Clinical illness with fever, night sweats, fatigue, anorexia, weight loss, headache and arthralgia

- Laboratory criteria for diagnosis:
  - Isolation of *Brucella* sp. from a clinical specimen, or
  - Fourfold or greater rise in *Brucella* agglutination titer between acute- and convalescent-phase serum specimens obtained greater than or equal to 2 weeks apart and studied at the same laboratory, or
  - Demonstration by immunofluorescence of *Brucella* sp. in a clinical specimen
Case classification

- **Probable**: clinically compatible case with an epidemiologic link
- **Confirmed**: clinically compatible case that is laboratory confirmed
Clinical Features

- Flu-like symptoms: "undulant" fever, headache, chills, myalgias, arthralgias, weakness and malaise
- Most recover entirely within 3 to 12 months
- Some develop ill-defined chronic syndrome
- Possible complications: arthritis, uveitis, sacroiliitis, spondylitis (10% of cases), meningitis (5%), and epididymoorchitis
Treatment

- Six week course of a combination of antibiotics.
- Doxycycline and rifampin or doxycyclin and streptomycin
Prevention/Infection Control

- Pasteurizing milk and dairy products
- Eradicating infection from herds and flocks
- Observing safety precautions for occupational exposures including
  - rubber boots
  - wearing impermeable clothing,
  - gloves and face masks
  - practicing good personal hygiene
Case Reports

Suspected Brucellosis Case Prompts Investigation of Possible Bioterrorism-Related Activity

MMWR Morb Mortal Wkly Rep 2000: 49(23)

http://www.cdc.gov/mmwr/PDF/wk/mm4923.pdf
Resources

CDC Emergency Preparedness and Response

www.bt.cdc.gov/agent/brucellosis/index.asp

USDA, APHIS, Veterinary Services

www.aphis.usda.gov/vs/nahps/brucellosis

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